

Editor's note: Appealed, sub nom John Hjervik and True Craig, Jr. v. Babbitt, Civ. No. 97-024-BLG (D. Mont. Feb. 28, 1997), rev'd and remanded, (Jan. 26, 1998), appeal filed, No. 98-35340 (9th Cir. March 26, 1998)

UNITED STATES
v.
DOROTHY HIGHSMITH ET AL.

IBLA 91-287

Decided December 31, 1996

Appeal from a decision of Administrative Law Judge Ramon M. Child in consolidated contest proceedings dismissing the contest of 11 mining claims. Consolidated contest Nos. MIM 77533, MIM 77534.

Reversed.

1. Mining Claims: Contests--Mining Claims: Determination of Validity--Mining Claims: Lode Claims

An exposure of a deposit of valuable mineral in place is a prerequisite of a location of a lode mining claim.

A prima facie case of the invalidity of a lode mining claim established by the testimony of a qualified Government mineral examiner that he has examined a claim and found no deposit of mineral in place may be rebutted by a preponderance of evidence supporting the exposure of mineral in place.

2. Mining Claims: Contests--Mining Claims: Determination of Validity--Mining Claims: Lode Claims

A qualified Government mineral examiner makes a prima facie case as to the invalidity of a lode mining claim when he testifies that he has diligently searched the claim in an effort to locate and sample mineral exposures to find any deposit of valuable mineral in place on the claim and not found any deposit of mineral in place. Once a prima facie case has been established, the burden shifts to the claimant to overcome that case by a preponderance of the evidence.

3. Mining Claims: Contests--Mining Claims: Determination of Validity--Mining Claims: Lode Claims

In those situations where values have been shown to be high and relatively consistent, geologic inference may be used to infer sufficient quantity of similar quality mineralization beyond exposed areas to justify a prudent man in investing his labor and capital with a reasonable prospect of success in developing a paying mine. A showing of podiform deposits of chromite irregular and scattered in occurrence is not sufficient to establish a geologic inference which will support a finding that there is a reasonable probability of a much larger deposit on the contested claims.

APPEARANCES: Jody Miller, Esq., Missoula, Montana, for the U.S. Forest Service, U.S. Department of Agriculture; Peter T. Stanley, Esq., Billings, Montana, for Iver J. Hjelvik; Harry J. Mehr, Esq., Glendive, Montana, for Dorothy Highsmith; and True Craig, Jr., pro se.

OPINION BY ADMINISTRATIVE JUDGE GRANT

The Forest Service (FS), United States Department of Agriculture, has appealed from an April 11, 1991, decision of Administrative Law Judge Ramon M. Child dismissing contest Nos. MIM 77533 (in part) and MIM 77534 (in its entirety) as to the Boulder, Drill, North Star, Siegfriedt (occasionally spelled Seigfreidt), Siegfriedt No. 1 through Siegfriedt No. 4, Sliderock, Bug 1, and Bug 2 lode mining claims. 1/ These proceedings were initiated by the filing of a contest complaint (MIM 77533) against Dorothy Highsmith and True Craig, Jr., the owners of a group of 12 claims and also against Iver J. Hjelvik (MIM 77534), the owner of the Bug 1 and Bug 2 claims which partially overlap the Highsmith/Craig claims. 2/ The claims were contested on the ground that minerals have not been found within the

1/ Judge Child also found the North Star No. 2, North Star No. 3, and North Star No. 4 lode mining claims (contest No. MIM 77533) invalid for failure to overcome contestant's prima facie case of the absence of exposure of valuable mineral in place. No appeal has been filed by contestees on these claims.

2/ The contested claims are grouped as follows:

Contest MIM 77533 (U.S. v. Highsmith/Craig):

Boulder	North Star number 3	Siegfriedt number 2
Drill	North Star number 4	Siegfriedt number 3
North Star number 1	Siegfriedt	Siegfriedt number 4
North Star number 2	Siegfriedt number 1	Sliderock

Contest MIM 77534 (U.S. v. Hjelvik):

Bug 1	Bug 2
-------	-------

limits of the claims in sufficient quantity and/or quality to constitute a valuable mineral deposit.

These contests were the subject of exhaustive hearings conducted over 9 days in two separate sessions. Contestant's case was presented at a hearing held in Billings, Montana, from July 17 through July 20, 1990. Citations to the transcript for this portion of the hearing are referred to herein as "I Tr." At the close of contestant's case, contestees moved to dismiss the contest for failure to establish a prima facie case. These motions were taken under advisement and subsequently denied by order of the Administrative Law Judge dated October 18, 1990. ^{3/} Accordingly, the hearing was reconvened from November 13 through November 17, 1990, for presentation of contestees' case. Citations to the transcript for this portion of the hearing are referred to as "II Tr." Exhibits introduced into evidence at the hearing are referred to by exhibit number prefaced by "G" for the Government (contestant), "CHI" for contestee Highsmith, and "CHJ" for contestee Hjervik.

In his decision on the merits, Judge Child bifurcated the issues to first consider whether the record established the exposure of mineral in place for the five claims initially found to be lacking such an exposure in his ruling on the motions to dismiss. Modifying his earlier finding after presentation of the case on behalf of the contestees, the Administrative Law Judge found that there was still no showing in the record of an exposure of valuable mineral in place with respect to certain claims (i.e., the North Star No. 2, North Star No. 3, and North Star No. 4). As a result, he declared these claims null and void. However, Judge Child found evidence in the testimony on behalf of contestees of the presence of a chromite deposit on the Siegfriedt claim. He also found that the FS mineral examiner had failed to sample an identified chromite exposure on the Siegfriedt No. 3 and that contestant was charged with knowledge of the presence of the exposure. With respect to these latter claims and the other claims which were contested, the Administrative Law Judge proceeded to consider whether the mineral deposit disclosed by the record would justify a person of ordinary prudence in the further expenditure of his labor and capital with the reasonable expectation of developing a paying mine.

^{3/} In his interlocutory order denying the motion to dismiss the contest, Judge Child found as an initial matter that the motion must be denied because of the evidence that the FS mineral examiner searched for but could not find "evidence of exposed mineral in place" on five of the claims (Siegfriedt, North Star No. 2, North Star No. 3, North Star No. 4, and Siegfriedt No. 3). He denied the motion as to the other claims as well in view of the testimony in contestant's case that mineral deposits on any of the claims could not be mined, removed, and marketed at a profit.

In considering the evidence, the Administrative Law Judge held that FS recognized that 16,840 short tons ^{4/} of chromite ore bearing an average of 31 percent chromite had been exposed on certain of the claims (Decision at 8). In addition, he held that the evidence supported the existence of a 5,000-ton stockpile of chromite on the North Star claim. *Id.* Judge Child also held that FS made a case for approximately 112,000 tons of indicated and inferred reserves bearing in excess of 20-percent chromite. *Id.* at 9.

Noting the FS contention that the reserves did not meet the marketability standard, the Administrative Law Judge weighed the evidence regarding marketability. Finding contestees' evidence to be more consistent and to represent a more reasonable analysis of marketability, Judge Child ruled that contestees overcame the prima facie case as to marketability by a preponderance of the evidence. *Id.* at 13.

In the statement of reasons for appeal (SOR), FS challenges Judge Child's decision on several grounds. First it is contended that there is no exposed mineral on the Siegfriedt and Siegfriedt No. 3 claims as the Administrative Law Judge ruled in his order denying the motion to dismiss.

For the Siegfriedt claim, FS contends it was error to rely on the testimony of contestees' expert, James Borders, since he acknowledged he could not identify chromite in the field. Further, FS asserts that an assayed sample of float taken by the FS mineral examiner, which was relied upon by the Administrative Law Judge in his decision, does not establish the presence of a deposit of mineral in place. Regarding the Siegfriedt No. 3 claim, FS argues that it was improper to rely upon a 40-year old mineral report which may have been based upon the presence of float rather than mineral in place as prevailing over the FS examiner's contrary report.

FS also contends that the fact that the mineral examiner analyzed a hypothetical deposit of 112,000 tons of chromite does not itself establish a "geologic inference" of a deposit of that size on contestees' claims. Rather, FS contends the marketability analysis was included to rebut any potential argument regarding marketability by contestees based on the presence of deposits on other claims which they own. FS asserts that the 1946 report of H. L. James (Exh. G-20), which was relied upon for the figure of 112,000 tons of chromite, discussed the possibility of undiscovered chromite in the district and was not supported by exposures, samples, or drill data. It is contended that the testimony of Barry Burkhardt, the FS mineral examiner, and Michael Burnside, the FS Regional Geologist called to testify by contestees, discussed the 112,000-ton figure as an estimate of possible resources in the area. Further, it is argued that geologic inference is not applicable in cases such as this involving podiform deposits.

^{4/} Due to some variation in the unit of measure used by various analysts in describing resources, the Administrative Law Judge set forth the following table of equivalents in his opinion: "One short ton equals 2,000 pounds. One long ton equals 2,240 pounds. One metric ton equals 2,204 pounds" (Decision at 5).

Additionally, FS argues that the Administrative Law Judge erred in rejecting the evidence regarding marketability presented by FS. Specifically, FS objects to the discounting of the roadbuilding costs presented in testimony at the hearing. Further, FS contends the Administrative Law Judge never made a finding regarding the cost of shipping chromite from South Africa purchased in North Carolina and implicitly accepted a rate of \$35 per ton despite evidence of a shipping rate of \$19.35 per ton. It is asserted that a revised mineral report may be properly relied upon in determining marketability when the basis for the revision is supported by the record.

In her answer to the SOR filed by FS, contestee Highsmith maintains that Burkhardt's mineral examination was flawed by his failure to use a hand lens in his field examination and his failure to consider disseminated ore deposits. Contestee further challenges his report on the basis of the failure to examine discovery pits pointed out by contestee Craig or shown on the Herdlick map (Exh. G-21) which was provided by Craig at the time of the examination. The marketability analysis of the 16,840-ton deposit prepared by Nicholas Wetzel (Exh. G-6) recognized by Burkhardt is challenged by contestee Highsmith as failing to consider either the 5,500-ton chromite stockpile established on the record or the chromite on Siegfriedt and Siegfriedt No. 3. Contestee argues that the decision in this contest is properly based on the initial FS mineral examiner's report (Exh. G-13) and not on contradictory testimony introduced at the time of the hearing. Further, contestee contends that the testimony regarding roadbuilding costs offered by FS witnesses is not credible because it was contradictory.

The answer filed on behalf of contestee Highsmith further defends reliance upon reports prepared in the 1940's, asserting that "had Mr. Burkhardt properly sampled the pits shown to him and removed the slough in the bottom of pits, he would have made the discoveries necessary to conclude that this contest should never have been commenced" (Answer at 22). Contestee argues that a discovery sufficient to support an independent mine is not required on each claim when there are contiguous claims sufficient to justify a profitable mining operation on the claims. Regarding marketability, it is contended that contestee's burden of proof extends to showing by a preponderance of the evidence a reasonable prospect of success in developing a paying mine and that contestee has accomplished this.

Regarding the Siegfriedt claim, contestee Highsmith acknowledges that the sample taken by Burkhardt on the claim was reported as not being mineral in place, but argues that it must be indicative of mineral in place on the claim. Further, contestee challenges the relevance of the sample in the absence of a test for disseminated ore. With respect to the Siegfriedt No. 3, contestee protests the failure of the FS mineral examiner to sample the exposure reportedly pointed out by contestee Craig.

An answer to the SOR filed by FS has also been submitted by contestee Iver J. Hjelvik. It is asserted that the use of the 112,000-ton chromite deposit model for analyzing marketability is appropriate given Burkhardt's testimony that this amount would take into account all of the claims owned by the contestees which would be mined in conjunction with the contested claims. Further, contestee contends that there is substantial evidence in the record to support a finding that a suitable mining road could be used with the expenditure of much less than the \$1.2 million projected by contestant's witness Pfau. Contestee notes evidence of record that Pfau's calculations were based on a wider than necessary roadway and that mining access was not one of Pfau's objectives in designing the road. Contestee argues that the FS discretion in regulating road improvements is restricted by contestees' right to access their mining claims. Finally, with respect to the marketability of the chromite on the claims, contestee cites the contradictory evidence presented by contestant, including a \$35 per ton shipping charge, in support of a conclusion that the finding entered by Judge Child on this issue was correct.

As a preliminary matter, we note that the 11 claims involved in this appeal are situated within the Hellroaring Plateau area of the Beartooth Ranger District of the Custer National Forest in the State of Montana. All except one of the claims involved in this appeal lie partially or wholly within the boundaries of the Absaroka-Beartooth Wilderness Area. The area was designated as Wilderness by Congress (Act of Mar. 27, 1978, P.L. 95-249, 92 Stat. 162; see Exh. G-4 at 3). Section 4 of the Wilderness Act of 1964 withdrew from mineral entry all wilderness areas on December 31, 1983, subject to valid rights then existing. 16 U.S.C. § 1133(d)(3) (1994). When public land has been closed to location under the mining laws subsequent to the location of mining claims, the claims must be supported by a discovery of a valuable mineral deposit at the time of withdrawal (December 31, 1983) in order to qualify as valid existing rights under section 4 of the Wilderness Act, and, further, must continue to be supported by a discovery at the time of the hearing. See United States v. Beckley, 66 IBLA 357, 361 (1982).

The threshold issue raised by this appeal is whether a deposit of a vein or lode bearing valuable mineral in place has been shown on the Siegfriedt and Siegfriedt No. 3 claims. Resolution of this issue involves several subsidiary questions including whether an exposure may be established by a sample taken from float on a claim and whether a prima facie case regarding the absence of a mineral deposit in place on the claim may be overcome by the testimony of a person who acknowledges limited ability to identify the mineral for which the claims were located in the field. With respect to the Siegfriedt No. 3, the question is raised whether it was proper to rely on a 40-year old mineral report to overcome the contrary contemporary mineral report of the FS examiner. A crucial issue with respect to all the claims on appeal is whether a deposit of 112,000 tons of chromite may be inferred to exist on the basis of the evidence

on the claims in the mining district controlled by contestees. Related questions include whether geologic inference may be applied to establish inferred reserves in the case of a podiform chromite deposit and whether geologic inference may be applied to establish inferred reserves on those claims for which the FS mineral examiner found no reserves. Finally, with respect to the deposit shown by the evidence to exist on certain of the claims, the issue is whether the record supports a finding of marketability of the deposit considering the costs, especially road construction, associated with extraction of the deposit and the price of chromite.

Mineral in Place

[1] It must be recognized that the sine qua non of a discovery is the exposure of a mineral deposit. Under 30 U.S.C. § 23 (1994), lode locations may be made "upon veins or lodes of quartz or other rock in place" bearing valuable mineral deposits. Absent the exposure of such "veins or lodes of quartz or other rock in place," there can be no valid lode claim. United States v. White, 118 IBLA 266, 315-16, 98 I.D. 129 (1991); United States v. Feezor, 74 IBLA 56, 74, 90 I.D. 262, 272 (1983), citing United States v. Henault Mining Co., 73 I.D. 184 (1966), aff'd, 419 F.2d 766 (9th Cir. 1969). On appeal, FS maintains there is no exposed mineral on the Siegfriedt and Siegfriedt No. 3 claims. Indeed, Burkhardt's report disclosed that he found no mineral in place on the Siegfriedt claim (Exh. G-4 at 12).

With respect to the Siegfriedt claim FS contends Judge Child erroneously relied on the testimony of contestees' witness, James Borders, that he observed chromite on the claim. This assertion is based on the fact Borders admitted he could not identify chromite in the field as he has no education, training, or expertise in mineral identification and testified that he could not differentiate between chromite and other dark minerals on the claims (II Tr. 767, 958, 973-76). There was, however, other evidence to support a finding of mineral in place on the Siegfriedt claim. Although Borders, a mining engineer, acknowledged his limitations at identifying chromite, he indicated that he relied upon input from a qualified geologist (II Tr. 976). Unfortunately, contestees were hampered by the unavailability of their geologist to testify due to ill health (II Tr. 691, 694). Borders testified, that apart from the chromite float on the Siegfriedt, there was ore in place in the structure pointed out to him in a dozer trench (II Tr. 829). The presence of ore in place on the Siegfriedt 5/ claim was also supported by James' report (Exh. G-20 at 183), although James did not recognize the presence of any tonnage of reserves on the claim. See Exh. G-20 at 178, Table 14. The FS mineral examiner indicated in his report that "no in place mineralization" was found on the claim,

5/ The Siegfriedt claims (Siegfriedt through Siegfriedt 4) were formerly known as the Gallon Jug claims (II Tr. 586). The early mineral reports identify the claims under their former name.

although he took a sample (Sieg. 1-9/17) from the wall of a small pit which assayed at 28.51-percent chromite (Exh. G-4 at 12-13). Even a good assayed sample of float will not itself suffice to establish a location of a lode claim. See United States v. White, 118 IBLA 266, 315-17 (1991); United States v. Parker, 82 IBLA 344, 357 (1984). With respect to the FS challenge to the Administrative Law Judge's decision on the basis that he relied on a sample of float rather than in place mineral, we find the other evidence of mineral in place on the claim sufficient to establish the presence of mineral in place on the Siegfriedt claim. ^{6/} To the extent the FS challenge to the validity or relevancy of old mineral reports may be taken as a challenge to James' report, it is not well grounded. The FS mineral examiner relied heavily on this report in preparing his own analysis. Burkhardt testified that he had studied James' report in detail and he had no reason to doubt his accuracy (I Tr. 86). In this regard, we also note Burkhardt's testimony that the workings on the claims basically date back to 1942 (shortly before James prepared his report) with only minor subsequent activity (I Tr. 128).

FS also asserts that Judge Child erroneously dismissed the contest as to the Siegfriedt No. 3 claim despite the lack of evidence of an exposed deposit of valuable mineral in place on the Siegfriedt 3. In rejecting contestant's evidence and finding an exposure of valuable mineral on the Siegfriedt 3 claim, Judge Child held:

In his mineral report, Mr. Burkhardt reports that since he found no mineralization on the Siegfriedt No. 3 claim, he took a sample " ... of the surface material approximately 100 feet below the rim of the Plateau". This sample when submitted to assay disclosed .63 percent Cr_2O_3 and .046 percent nickel (Exh. G-13, at 28-29; Exh. G-4 at 27-28). Mr. Burkhardt claimed to sample those areas identified in the mapping and literature as showing known chromite containing serpentine lenses (I Tr. 199), but he did not sample such an identified exposure on the Siegfriedt No. 3 (Exhibit G-21, figure 3 at 10; Exh. CHI-5). Although not sampled, contestant is charged with knowledge of the presence of such exposure on the Siegfriedt No. 3 claim.

^{6/} Thus, the evidence with respect to the existence of mineral in place on the Siegfriedt claim is properly distinguished from evidence sufficient to establish the presence of valuable mineral in place on the claim. See United States v. Feezor, *supra* at 74-75, 90 I.D. at 272-73. As noted in the Board's opinion, the exposure of a mineral deposit means a mineralized area in a vein or lode and does not necessarily mean that a valuable mineral deposit has been exposed. Geologic inference may not be used to establish the presence of a valuable mineral deposit where no mineral deposit has been exposed within the claim. *Id.* at 75, 90 I.D. 273.

The unsampled exposure on the Siegfriedt No. 3 claim is assumed to disclose ore which comprises part of the 112,000 short tons of inferred chromite in the immediate area.

(Decision at 7).

FS contends that Judge Child was in error in finding exposed mineralization in place based on a 1948 report by J. A. Herdlick (Exh. G-21) notwithstanding Burkhardt's unrefuted testimony that after thorough examination of the claim he found no exposed mineralization (I Tr. 136-46; Exh. G-4 at 27-28). It is pointed out by FS that there is no indication from the Herdlick report that the chromite-bearing serpentine reported in 1948 embraced chromite of a quality or quantity suitable to validate the claim. In particular, FS notes that the only description of the results of the examination relates: "Hand trenching and exploration by bulldozer exposed chromite lenses or float on the Gallon Jug Nos. 1, 2, 3 and 4, the Bluebird No. 2, and the Rainbow No. 4 claims. * * * The deposits in this area are small and discontinuous" (G-21 at 12 (emphasis added)).

Contestant's mineral examiner, Burkhardt, described his visits to the claims in his testimony. Specifically, he testified to an August 1, 1984, visit to the claims accompanied by contestee Craig and contestees' geologist, R. H. Little, for the purpose of identifying both the claim corners and discovery points or exposures on the claims (I Tr. 129-30). Although they did not physically go upon the Siegfriedt No. 3 on that day (I Tr. 132), Craig testified that he pointed out to Burkhardt the exposure of mineral on the edge of the cliff (II Tr. 717, 719). Craig described the exposure on the Siegfriedt No. 3 as "serpentine, chrome" which he identified at the hearing as being at the red "X" (Burkhardt sample point) marked on the map of the claims (Exh. G-3) introduced at the hearing (II Tr. 718-19). Describing his examination of the Siegfriedt No. 3 claim on September 6, 1984, Burkhardt stated "We got to the Siegfriedt 3 claim, spent considerable time wandering back and forth across that claim trying to locate a good sample point" (I Tr. 140). In his mineral report, Burkhardt recited that "[n]o in place mineralization was found on the claim so sample Sieg. 3-1-9/6 was taken of surface material approximately 100 feet below the rim of the Plateau on a south facing slope" (Exh. G-4 at 28).

[2] Figure 3 of the Herdlick report (Exh. G-21) does depict an area of chromite-bearing serpentine on Siegfriedt No. 3, but no samples were assayed and this map does not itself establish an exposure of valuable mineral in place. Contestees presented no assayed samples from any deposit on the claim. As quoted above, the Herdlick report disclosed that some of the showings constituted float. Significantly, James noted in his report that: "Float ore has been found on the Gallon Jug No. 3 claim, but so far as is known the bedrock source has not been located" (Exh. G-20 at 185). It appears from the record that the FS mineral examiner made a substantial effort, after reviewing the relevant background reports and interviewing contestees, to locate any deposits of valuable mineral in place exposed on the Siegfriedt No. 3 claim. The Administrative Law Judge expressly found that FS had presented a prima facie case on this matter when he denied

the motion to dismiss the contest as to the Siegfriedt No. 3 claim in his order of October 18, 1990, and the record supports this finding. Although the credibility of the contestant's mineral examiner may be impaired by the failure to look for and examine reported exposures of significance, it appears from the record in this case that the FS mineral examiner made a deliberate effort to locate and sample mineral exposures. It is well established that Government mineral examiners are neither required to perform discovery work for claimants, nor to explore beyond a claimant's workings. United States v. Page, 119 IBLA 12, 23 (1991); United States v. McLaughlin, 50 IBLA 176 (1980). Once a prima facie case has been established, the burden shifts to the contestee to overcome that case by a preponderance of the evidence. Hallenback v. Kleppe, 590 F.2d 852, 856 (10th Cir. 1979); United States v. Zweifel, 508 F.2d 1150, 1157 (10th Cir. 1975), cert. denied, 423 U.S. 829 (1976); United States v. Husman, 81 IBLA 271, 275 (1984). We find no basis in the record to support the decision of the Administrative Law Judge to the extent that he found a discovery of valuable mineral in place and, hence, the decision below is reversed to the extent the contest was dismissed on this basis.

Reserves

Where the Government contests a mining claim for lack of discovery of a valuable deposit, it has the burden of going forward to establish a prima facie case as to that charge; however, the mining claimant has the ultimate burden of overcoming the Government's case by a preponderance of the evidence. Hallenback v. Kleppe, *supra*; United States v. Zweifel, *supra*. In his testimony, Burkhardt, the FS mineral examiner, acknowledged the presence on the North Star, Drill, Siegfriedt No. 1, Siegfriedt No. 2, and Siegfriedt No. 4 claims of chromite reserves totalling 16,840 short tons (I Tr. 159). Burkhardt explained that his use of the word "reserves" did not mean that this volume of mineral resources could be mined at a profit (I Tr. 157). His use of the term was somewhat misleading as a "reserve" is more commonly and appropriately defined as that part of an identified mineral "resource" which can be economically extracted or produced at the time of determination. See Vanderbilt Gold Corp., 126 IBLA 72, 78-82 (1993) (discussing the definitions set forth in Society for Mining, Metallurgy, and Exploration, Inc., A Guide for Reporting Exploration Information, Resources and Reserves, 43 Mining Engineering 379-84 (April 1991)).

Burkhardt's figures broken down by individual claims were also stated in his mining claim reports as follows:

Deposit	Reserves (st)	Avg. % Cr ₂ O ₃	Source for Reserves
North Star Pit	1,750	31.39	Calculation
Drill Pit	1,100	18.47	James, 1946
Siegfriedt #1 Claim	990	35.79	Calculation
Siegfriedt #2 Area	880	16.81	James, 1946
Siegfriedt #4 Claim	12,120	33.41	James, 1946
Total	16,840		

(Exh. G-4 at 32, Exh. G-13 at 42). Reserves were stated by Burkhardt in short tons (abbreviated "st" and equaling 2,000 pounds) as compared to figures in long tons (equaling 2,400 pounds) given by James. See I Tr. 168. The weighted average grade of these chromite deposits was calculated as 31.5 percent based on the assay value of his samples (Exh. G-4 at 34; Exh. G-13 at 34; I Tr. at 281). Burkhardt explained in his report that his estimate of reserves was "based on [his] field examination and on estimates made by H. L. James (1946)" (Exh. G-4 at 32; Exh. G-13 at 31). Burkhardt referred to these reserves as "indicated," which he defined as reserves where one knows two dimensions and bases the third dimension on a geologic interpretation of how far the third dimension may extend (I Tr. 159). In explaining his reliance on James' report, Burkhardt stated that it was prepared contemporaneously with the end of the U.S. Vanadium mining operation and that James had access to the U.S. Vanadium drill hole data (I Tr. 114). Indeed, James stated that his estimates of probable reserves for claims that have undergone development were based on surface measurements and drill hole data obtained from U.S. Vanadium (Exh. G-20 at 177).

In his report, Burkhardt also noted that: "Inferred reserves for the entire mining district are estimated at a maximum of 112,000 st, which includes the 16,840 st of indicated reserves on the claims covered by this report (James, 1946)" (Exh. G-4 at 35; Exh. G-13 at 36). Burkhardt testified that James stated that "the reserves for the entire [Red Lodge mining district] would not exceed 100,000 tons" ^{7/} (I Tr. 160). Reference to the James report puts the statement in perspective, disclosing James' assessment that: "Since most of the ore in the larger known ore bodies has been taken out, the amount of ore that might ultimately be mined in the district is almost entirely dependent upon the discovery of deposits at present unknown" (Exh. G-20 at 177). Further, James gave his opinion that "the total amount of ore that might be discovered in the covered areas will not exceed 100,000 tons" (Exh. G-20 at 178).

Judge Child based his decision on a finding that:

The Government further made a case for approximately 112,000 short tons of indicated and inferred reserves of mineral bearing in excess of 20 percent chromite in the immediate area on these and other claims held by contestees. The contestees are entitled to a finding of these amounts of reserves being present on the claims at a minimum.

(Decision at 9).

While recognizing that if evidence of additional quantities of chromite discovered on other claims controlled by the contestees in the mining district had been presented at the hearing, the "claims could be considered together as a group for the purpose of ascertaining the validity of

^{7/} The equivalent of 100,000 long tons is 112,000 short tons.

the individual contested claims" (SOR at 18), 8/ FS denies that the record supports the discovery of a 112,000 short ton deposit. It avers that its consideration of a hypothetical deposit of 112,000 short tons of high quality material is neither an admission nor proof that 112,000 short tons of chromite exists on the claims and denies its testimony entitles contestees to a geological inference that 112,000 short tons of chromite reserves actually exist as found by Judge Child. Id.

We find that the Administrative Law Judge erred in concluding that FS made a case for the discovery of a deposit of 112,000 tons on the claims in the mining district owned or controlled by contestees. It appears from the evidence that James' figure was an estimate of additional reserves which might be discovered in the area. 9/ This assessment was confirmed by the FS Regional Geologist, Burnside (II Tr. 499). The only deposits of chromite on claims belonging to contestees which Burkhardt's testimony established were the indicated chromite resources set forth above on the contested claims. Although Burkhardt considered the potential impact of the 112,000 tons of chromite which James had indicated might be discovered in the mining district in view of contestees' ownership of a number of other chromite claims in the area, Burkhardt neither examined these other claims nor took mineral samples on them. See I Tr. 220-21.

[3] In analyzing the applicability of geologic inference to establish reserves, we have held that

where values have been high and relatively consistent, geologic inference can be used to infer sufficient quantity of similar quality mineralization beyond the actual exposed areas, such that a prudent man would be justified in expending labor and means with a reasonable prospect of success in developing a paying mine.

United States v. Feezor, supra at 79, 90 I.D. at 274-75; see also United States v. Dresselhaus, 81 IBLA 252, 267-68 (1984). Burkhardt's testimony

8/ When an exposure of valuable locatable mineral in place has been shown to exist within the boundaries of each mining claim, a group of contiguous mining claims can be considered as a group when determining whether a person of ordinary prudence would be justified in the further expenditure of his time and means with a reasonable prospect of success in the development of a mine. The concept of developing a "mine" can reasonably contemplate operations on a series of contiguous claims. United States v. Foresyth, 100 IBLA 185, 94 I.D. 453 (1987).

9/ James was performing a study of the availability of chromite as part of a study of strategic minerals for the U.S. Geological Survey. See I Tr. 86.

was that the chromite occurring on the claims consisted of podiform deposits which are "very irregular" and "randomly scattered" (I Tr. 158). This was consistent with James who referred to the chromite deposits of the Red Lodge region as "podlike in form" (Exh. G-20 at 166). Michael Burnside, FS geologist called to testify by contestees, also described this as a podiform deposit, although he noted that where you have a podiform deposit on a larger scale, there is potential for a number of lenses of chromite in the area (II Tr. 440). Neither the report of James nor the mineral report of Burkhardt establish values in exposed deposits on the claims owned or controlled by contestees which are high enough and consistent enough to support a geologic inference of the existence of 112,000 tons of chromite reserves on contestees' claims.

Further, we find that term "reserve" does not correctly apply to this hypothetical deposit. Deposits of mineral resources are properly classified in three categories: measured, indicated, and inferred. The definition of inferred resources has been stated as follows:

Estimates are based on geological evidence and assumed continuity in which there is less confidence than for measured and (or) indicated resources. Inferred resources may or may not be supported by samples or measurements but the inference must be supported by reasonable geo-scientific (geological geochemical, geophysical, or other) data.

Society for Mining, Metallurgy, and Exploration, Inc., A Guide for Reporting Exploration Information, Resources and Reserves, 43 Mining Engineering 379, 380 (April 1991), quoted in Vanderbilt Gold Corp., 126 IBLA 72, 81 (1993). The meaning of the term inferred resources is placed in context when compared with the definitions of measured and indicated resources. In the case of measured resources, "[q]uantity is computed from dimensions revealed in outcrops, trenches, workings or drill holes" and quality is determined from detailed sampling results. Further, with respect to measured resources: "The sites for inspection, sampling and measurement are spaced so closely and the geological character is so well defined that size, shape, depth and mineral content of the resource are well established." Less certain are indicated resources where "the sites for inspection, sampling, and measurements are farther apart or are otherwise less adequately spaced," but reliability is "high enough to assume geological continuity between points of observation." Vanderbilt Gold Corp., supra at 80 (quoting Society for Mining, Metallurgy, and Exploration, Inc., A Guide for Reporting Exploration Information, Resources and Reserves, 43 Mining Engineering 379, 380 (April 1991)). Reserves, which, as previously noted, can reasonably be assumed to be economically producible, do not include inferred resources which lack the certainty required to be reported as a reserve. See Society for Mining, Metallurgy, and Exploration, Inc., A Guide for Reporting Exploration Information, Resources and Reserves, 43 Mining Engineering 379 (April 1991); Vanderbilt Gold Corp., supra at 82. Thus, we find FS made a prima facie case that the resources in place on the claims totalled 16,840 tons.

The testimony on behalf of contestees offered little basis to rebut this prima facie case and little support for the existence of 112,000 tons of chromite reserves on claims controlled by contestees. Contestees' witness Borders testified that he had visited the claims on three occasions and that samples were taken by him and by contestees' geologist, Little; however, no reports of assay results were brought by contestees to the hearing (II Tr. 958-64). Burkhardt confirmed in his testimony that no assay results were ever provided by claimants (I Tr. 121). The tonnage estimates given in Borders' report (Exh. CHI-10) were based not on his examination of the claims, but rather, on his projections based on his review of the literature. See II Tr. 997. Borders testified that the measurements on which his calculations were based were not made by him personally, but were all taken from the literature (II Tr. 1,000). Although he purportedly used measurements obtained from the literature, he admitted that he had rejected estimates of reserves calculated by those same sources (II Tr. 1,000).

For example, despite the absence of evidence of samples and assays provided by the contestees, Borders calculated 44,419 tons of what he labeled "proven" ^{10/} reserves on the Siegfriedt claim based on a vein length of 390 feet (Exh. CHI-10 at 2-3). Although it appears from Borders' report that the vein length was taken from a table prepared by E. B. Hubard (for which the explanatory report of Hubard was not provided) and a single reported assay by J. F. Brophy for which no supporting information was provided (see Exh. CHI-10 at 2-3, 2-8, App. III), he also testified to calculating the strike length by measurements made using James' magnetometer grid on a map of the claims (II Tr. 1,023-26). This contrasts with the report of James, who listed no reserves for this claim, and the testimony of Burkhardt. Similarly, with respect to the Siegfriedt No. 1 claim, Borders calculated 18,027 tons of "proven" reserves based on a purported vein length of 300 feet taken from Hubard and an assay taken from Brophy. See Exh. CHI 10 at 2-9 through 10. No reserves were listed for this claim by James in his report (Exh. G-20). Burkhardt did take a sample across a "small mineralized pod, pointed out * * * by the claimant," which assayed at 35.79 percent chromite (Exh. G-4 at 21-22; see Exh. G-13 at 22).

Burkhardt calculated the volume of material by multiplying the strike length by the width by the depth (one-half the strike length) and found the deposit to consist of 990 tons (Exh. G-4 at 33; Exh. G-13 at 33). With respect to other contested claims such as the North Star and the Drill, Borders chose to reject the contemporary analysis of Burkhardt and to estimate reserves on the basis of projections of veins reported in certain historical literature (CHI-10 at 2-5, 2-6), despite the contrary report of James.

^{10/} Although Borders characterized this volume as "proven" reserves, it is clear from the lack of assayed samples that any such resources would have to be inferred and Borders acknowledged this in his testimony (II Tr. 1,027).

Contestees also sought to establish the presence on the claims of disseminated ore outside the podiform deposits. See Exh. CHI-10 at 2-3. Borders testified to a cutoff grade of 5-percent chromite on disseminated ore. Borders stated that in calculating a figure for inferred reserves based on disseminated ore, he developed a ratio of massive to disseminated ore, based in part on the Simons' report (Exh. CHI-10 at App. V) and applied that ratio to his projections of "proven" reserves (II Tr. 849, 995-97). Utilizing this ratio, he projected disseminated reserves of 1,178,216 tons (Exh. CHI-10 at 2-3). ^{11/} However, the Simons report relied on by Borders in his analysis contradicted his analysis in its conclusion:

The results of sample analyses shown above do not suggest significant dissemination of chromite either within the serpentine bodies or in the enclosing metamorphic rocks of the roof-pendants. It is concluded therefore that the potential for future chromite discoveries in the immediate area of the Red Lodge deposits lies in the discovery of additional discrete ore bodies within the serpentine such as those mined previously.

(Exh. CHI-10, App. V at 155). Further, Michael Burnside, FS Regional Mining Geologist, called as a witness by contestees, testified that in examining the contested claims he was specifically looking for disseminated chromite in the serpentine adjacent to the pods (II Tr. 471) and that his experience would lead him to believe there was no disseminated chromite in the ground (II Tr. 473). In his report (CHJ-9), Burnside concurred with Simons' conclusion noting that he sampled at right angles to the strike of the vein to ascertain disseminated ore and found no disseminated chromite resources averaging 5-percent chromite as Borders had projected in the serpentinite outside the pods (CHJ-9 at 3, 5-6). On the basis of the evidence, we conclude that contestees failed to overcome the prima case that discovered chromite resources in place on contestees' claims were limited to 16,840 tons. ^{12/}

^{11/} Borders also calculated in his report a third category of reserves which he labelled "inferred" for the contested claims as well as contestees' other claims in the area (Exh. CHI-10 at 2-3). Borders gave no basis for these projections either in his report or in his testimony. He projected a total of indicated plus inferred (including disseminated) reserves of 6,025,485 tons (II Tr. 851; Exh. G-22).

^{12/} Contestees have argued that the chromite reserves should have also included the tonnage which James estimated to be within the dump or stockpile on the North Star claim. James referred to an estimated 5,500-ton stockpile of milling ore containing 10- to 20-percent chromite on the claim (Exh. G-20 at 178, Table 14). Noting that the stockpile did not constitute mineral in place and that there was no way to determine where it came from, Burkhardt testified that he did not take any samples from the stockpile which was reported to be lower in value than the average grade of his sampling (I Tr. 284-85, 343). See United States v. Mavros, 122 IBLA 297, 306 (1992).

The basic standard of discovery under the mining laws was set forth by the Department long ago:

[W]here minerals have been found and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine, the requirements of the statute have been met.

Castle v. Womble, 19 L.D. 455, 457 (1894); followed, Chrisman v. Miller, 197 U.S. 313, 322 (1905). This standard has been supplemented by the "marketability test" requiring a showing that the mineral deposit can be extracted, removed, and marketed at a profit. United States v. Coleman, 390 U.S. 599 (1968).

The FS examiner Burkhardt prepared more than one mining claim report regarding the contested claims and the admissibility of his revised report (Exh. G-4, dated July 6, 1990) was raised as an issue at the hearing. The Administrative Law Judge admitted the revised report subject to admission also of the original report (Exh. G-13, dated January 23, 1987). The issue has been raised again in contestee Highsmith's answer on appeal. We conclude that both reports were properly admitted into evidence. This Board has held that the revised opinion of a FS mineral examiner regarding the existence of a discovery on contested mining claims would not be irrelevant if sufficient basis is given for the revision, although the previous opinion may serve to impeach the later opinion. United States v. New York Mines, Inc., 105 IBLA 171, 181 (1988).

In Burkhardt's reports, he analyzed the marketability of the 16,840-ton deposit which he found to exist on the contested claims using a model for mining and milling costs developed by Nicholas Wetzel of the U.S. Bureau of Mines (I Tr. 240; Exh. G-4 at 35, Exh. G-13 at 36). By the time of the contest hearing, Wetzel had developed a report of the costs of mining, milling, and transporting the product to the railhead which was introduced as an exhibit. See Exh. G-6; I Tr. 390. Wetzel itemized projected costs for developing the deposit including costs of mining the chromite, costs of milling to produce 40-percent concentrate (the grade generally required by industry at the refinery (I Tr. 404-05)), and the costs of transporting the concentrate to the railhead at Laurel, Montana (Exh. G-6). He then calculated the figure for these costs per ton of concentrate produced (Exh. G-6 at 17). In his revised report, Burkhardt took these costs and added costs for certain items not considered by Wetzel including environmental analysis, road reconstruction, and shipping to market at Castle Haynes, North Carolina (Exh. G-4 at 36, Table 1). Totalling these costs, Burkhardt divided the total by the number of tons of 40-percent chromite concentrate which would be produced from the deposits to arrive at a cost of \$231.57 per ton of concentrate in 1990 and \$196.03 per ton of concentrate at the end of 1983 (Exh. G-4 at 36, Table 1). Comparing these totals with the cost of imported chromite concentrate at the end of 1983 (\$66.35 per ton) and in 1990 (\$84.35 per ton) provided

by Richard Marshall, FS Minerals Economist, Burkhardt found that the cost of producing and transporting chromite concentrate from the claims would exceed the market value of the chromite (Exh. G-4 at 37). Based on these findings, he concluded that a person of ordinary prudence would not be justified in the further expenditure of his labor and capital with a reasonable prospect of success in developing a paying mine (I Tr. 171-72).

The estimate of costs for environmental analysis (Exh. G-12) was agreed to by stipulation at the hearing (I Tr. 726-27). With respect to the cost of shipping to market, Burkhardt testified that he used the Diamond Shamrock plant at Castle Haynes "as the market for the material because the claimants had dealt with that company and had indicated that they would probably be looking at that plant as a market" (I Tr. 305). ^{13/}

The shipping cost per ton of concentrate utilized by Burkhardt for 1989 (shortly before the hearing) was \$34.09, a figure researched by FS Mineral Economist Richard Marshall (Exh. G-11 at 11). Burkhardt calculated the value of this cost in 1984 dollars as \$30.53 (Exh. G-4 at 36). ^{14/}

The costs for road reconstruction to facilitate removal of chromite from the claims was a much more controversial issue at the hearing. The contestees vigorously challenged the road reconstruction costs set forth by FS and relied upon by Burkhardt. The record establishes that there is a road to the claims which dates back at least to the time when chromite was produced from certain of the claims. See I Tr. 66. Burkhardt testified that his figure for these costs used in his revised mineral report (Exh. G-4) was based on the itemized estimate prepared by James Pfau, FS Highway Engineer (Exh. G-9). See I Tr. 169. Pfau's cost estimate for rebuilding the road totalled approximately \$1.2 million (I Tr. 572, Exh. G-9). However, Pfau admitted mining access was not considered as an objective in his road design (I Tr. 605). Criteria considered in the design included safety, recreational traffic access, and visual impact (I Tr. 556). Further, the road was designed to achieve a lifespan of 20 years despite the fact that mining of the contested claims would be accomplished in one 90-day season (I Tr. 620). Contestees' witness James Borders, a mining engineer with experience in mine road construction, testified to road improvement costs of \$229,000 (II Tr. 880, Exh. CHI-14 at 4-5). We

^{13/} There was testimony on behalf of contestees at the hearing that Boulder Gold, Inc., was considering the possibility of building a milling facility and smelter in the region to utilize a new process to extract chrome from chromite mined from the Stillwater deposits in a nearby mining district (II Tr. 27, 148-49, 203-05). It appears that this was anticipated as a potential market by the time of the hearing (II Tr. 55, 232, 318); however, Boulder Gold was not involved with chromite in the region until 1986 and was not a factor at the time of the withdrawal at the end of 1983 (II Tr. 258). Contestee Hjervik acknowledged that he would have had to mill the ore himself in 1984 (II Tr. 74).

^{14/} Burkhardt's earlier mineral report (Exh. G-13) had used a higher shipping cost for 1984 which Marshall acknowledged was incorrect (II Tr. 788).

find that the record supports the Administrative Law Judge's finding that Borders allowed "reasonable costs for road improvements" (Decision at 13).

Accordingly, we conclude that the cost of road reconstruction as a component of the cost of producing the chromite concentrate is properly reduced to \$21.59 per ton of concentrate at the time of the hearing and \$17.70 per ton of concentrate as of the end of 1983. This would reduce the cost per ton of concentrate to \$120.99 and \$140.06 at the end of 1983 and the time of the hearing, respectively. Although this would reduce the loss per ton of concentrate, it would not establish a return in excess of costs.

With respect to the resources found in the North Star dump, we find that, given the demonstrated presence of a deposit of mineral in place on the claim, these are relevant to the issue of discovery of a valuable mineral deposit. See United States v. Crowley, 124 IBLA 374, 384-85 (1992). No evidence has been offered by contestees as to the impact of this dump on marketability of the resources on the claims, however, and we decline to speculate on this matter other than to note that even if no additional costs were added for production of the resources found in the dump, the cost per ton of concentrate produced would still exceed the return established at the hearing.

Thus, we must conclude that contestees have failed to overcome the prima facie case of lack of a discovery of a mineral deposit in a quantity and quality sufficient to justify a person in the further expenditure of his labor and capital with a reasonable expectation of developing a paying mine.

We note that the parties to this appeal have made many diverse arguments, some less germane than others, in support of their position on appeal. To the extent that other arguments raised by the parties have not been specifically addressed herein, they have been considered and rejected.

Therefore, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decision appealed from is reversed and the contested mining claims are declared null and void.

C. Randall Grant, Jr.
Administrative Judge

I concur:

Franklin D. Arness
Administrative Judge